The definition of Smarandache reconcatenated sequences and six such sequences

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Abstract. In this paper I define a *Smarandache reconcatenated sequence* Sr(n) as "the sequence obtained from the terms of a Smarandache concatenated sequence S(n), terms for which was applied the operation of consecutive concatenation" and I present six such sequences. Example: for *Smarandache consecutive numbers sequence* (1, 12, 123, 1234, 12345...), the *Smarandache reconcatenated consecutive numbers sequence* has the terms: 1, 112, 112123, 1121231234, 112123123412345...). According to the same pattern, we can define back reconcatenated sequences (the terms of the *Smarandache back reconcatenated consecutive numbers sequence*, noted Sbr(n), are 1, 121, 123121, 1234123121...).

Definition:

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I.

The reconcatenated back concatenated odd prime sequence

S(n) is defined as the sequence obtained through the concatenation of the first n primes, in reverse order, having the terms (A092447 in OEIS): 3, 53, 753, 11753, 1311753, 171311753, 19171311753, 2319171311753, 292319171311753, 31292319171311753 (...).

The terms of Sr(n): 3, 353, 353753, 35375311753, 353753117531311753, 353753117531311753171311753 (...)

The terms Sr(2) = 353 and Sr(4) = 35375311753 are primes. The question is: are there infinitely many primes in this sequence?

II.

The reconcatenated back concatenated odd sequence

S(n) is defined as the sequence obtained through the concatenation of the first n odd numbers, in reverse order, having the terms (A038395 in OEIS): 1, 31, 531, 7531, 97531, 1197531, 131197531, 15131197531, 1715131197531, 1917151311975311, 211917151311975311 (...)

Because sometimes are obtained interesting results not considering the initial term of a Smarandache concatenated sequence (e.g., in this sequence, considering as the first term the number 31, the back concatenation of the second odd number, 3, with the first, 1, and not the initial term, 1) we will proceed this way reconcatenating this sequence. To distuinguish such sequences from the standard ones, we will note them S+(n), having in this case the terms 31, 531, 7531, 97531 (...), respectively Sr+(n).

The terms of Sr+(n): 31531, 315317531, 31531753197531, 3153175319753111197531, 315317531975311197531131197531, 31531753197531119753113119753115131197531 (...)

The terms Sr+(2) = 315317531 and Sr+(6) = 31531753197531119753113119753115131197531 are primes. Note that Sr+(6) is a prime with 41 digits! The question is: are there infinitely many primes in this sequence?

III.

The reconcatenated reverse sequence

S(n) is defined as the sequence obtained through the concatenation of the first n positive integers, in reverse order, having the terms (A000422 in OEIS): 1, 21, 321, 4321, 54321, 654321, 7654321, 87654321, 987654321, 10987654321 (...)

We will reconcatenate the sequence S+(n), accordingly to the definition from the previously treated sequence, having in this case the terms 21, 321, 4321, 543211, 654321 (...).

The terms of Sr+(n): 21321, 213214321, 21321432154321, 21321432154321654321, 213214321543216543217654321, 21321432154321654321765432187654321, 21321432154321654321765432187654321987654321 (...)

The terms Sr+(2) = 315317531 and Sr+(7) = 21321432154321654321765432187654321987654321 are primes. Note that Sr+(7) is a prime with 44 digits! The question is: are there infinitely many primes in this sequence?

IV.

The reconcatenated back concatenated square sequence

S(n) is defined as the sequence obtained through the concatenation of the squares of the first n positive integers, in reverse order, having the terms (A038397 in OEIS): 1, 41, 941, 16941, 2516941, 362516941, 49362516941 (...)

We will reconcatenate the sequence S+(n), accordingly to the definition from the previously treated two sequences, having in this case the terms 41, 941, 16941, 2516941 (...).

The terms of Sr+(n): 41941, 4194116941, 41941169412516941, 41941169412516941362516941, 4194116941251694136251694149362516941, 41941169412516941362516941493625169416449362516941 (...)

The term Sr+(6) is a semiprime having 50 digits! The question is: are there infinitely many primes in this sequence?

V.

The reconcatenated “odd n concatenated n times” sequence

S(n) is defined as the sequence obtained concatenating n times the odd number n: 1, 333, 55555, 7777777, 999999999(...)

The terms of Sr(n): 1333, 133355555, 1333555557777777, 1333555557777777999999999, 13335555577777779999999991111111111111111111111 (...)

The term Sr(5) is a semiprime having 47 digits. The question is: are there infinitely many primes in this sequence?

VI.

The back reconcatenated “n concatenated n times” sequence

S(n) is defined as the sequence obtained concatenating n times the number n: 1, 22, 333, 4444, 55555, 666666, 7777777 (...)

The terms of Sbr(n): 1, 221, 333221, 4444333221, 555554444333221, 666666555554444333221, 7777777666666555554444333221, 888888887777777666666555554444333221, 999999999888888887777777666666555554444333221 (...)

The term Sr(10) is a semiprime having 65 digits. The question is: are there infinitely many primes in this sequence?